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Sem-VI
25/04/2025

Time: 3 Hours **Marks: 75**

Note: All Questions are Compulsory.
Figures to the right indicate full marks.
Draw diagrams wherever required.
Use of Scientific calculator is permitted

Question no		Marks
Q.I		
1	Which term describes the quantification of time-dependent changes in drug or metabolite concentration during absorption, distribution, metabolism, and excretion?	1
a	Pharmacokinetics	
b	Pharmacodynamics	
c	Biopharmaceutics	
d	Biostatistics	
2	What is the primary absorption process for more than 90% of drugs?	1
a	Facilitated dilution	
b	Active transport	
c	Endocytosis	
d	Passive diffusion	
3	Which law governs drug diffusion based on concentration gradient?	1
a	Fick's Third law of diffusion	
b	Fick's First law of diffusion	
c	Fick's Second law of diffusion	
d	Fick's Mixed law of diffusion	
4	Which statement about the Biopharmaceutical Classification System is true?	1
a	Class II- Low solubility, High permeability, Class III- High solubility, Low permeability	
b	Class II- High solubility, High permeability, Class III- High solubility, High permeability	
c	Class II- Low solubility, Low permeability, Class III- Low solubility, Low permeability	
d	Class II- High solubility, Low permeability, Class III- Low solubility, High permeability	

5 Select the dissolution order of different solid drug forms? 1

a amorphous > Metastable >Stable

b amorphous > Stable > Metastable

c Stable > amorphous > Metastable

d Metastable > amorphous >Stable

6 What does the volume of distribution represent? 1

a Hypothetical volume in which drug is distributed

b Volume of fluids in tissue in which drug is distributed

c Total body water

d Water in which the tablet disintegrates

7 Select correct statement 1

a Drugs with high plasma protein binding have apparently low volume of distribution

b Drugs with low plasma protein binding have apparently low volume of distribution

c Drugs with high plasma protein binding have apparently high volume of distribution

d Drugs with high plasma protein binding have no effect on apparent volume of distribution

8 Which of these is a Phase II Biotransformation reaction? 1

a Oxidation of olefins

b Reduction of olefins

c Hydrolysis of amides

d Conjugation with alpha amino acids

9 Clearance is 1

a Hypothetical volume of body fluids containing drugs from which the drug is completely removed in a specified period of time.

b Time period in which drugs are completely removed from the body.

c Amount of drug that is completely removed from the body in a specified period of time.

d Fraction of drug that is completely removed from the body in a specified period of time.

10 Area under curve represents 1

a Rate of drug absorption

b Extent of drug absorption

c Duration of action

d Therapeutic index

11 Which of the following is an equipment-related parameter affecting dissolution? 1

a Agitation

b pH of dissolution medium

c Solubility

d Volume of media

12 What is the area of the solid surface exposed to the dissolution medium called? 1

a Absolute Surface area

b Effective Surface area

c Free Surface area

d Exposed surface area

13 When does the onset of action occur? 1

a when plasma drug concentration just exceeds the minimum effective concentration

b when plasma drug concentration just exceeds the maximum safe concentration

c when plasma drug concentration is just below the minimum effective concentration

d when plasma drug concentration is just below maximum safe concentration

14 Under these circumstances the value of absorption rate constant is computed from method of residuals is correct: 1

a $K_a / K_e = 3$

b $K_e / K_a = 3$

c $K_a / K_e \geq 3$

d $K_e / K_a \geq 3$

15 The peak of plasma drug concentration time curve of a drug represents 1

a The biological half- life of a drug.

b The amount of a drug is the original dosage form.

c The maximum plasma drug concentration.

d The amount of drug excreted in the urine.

16 In pharmacokinetic modeling, a mammillary model consists of 1

a Compartments arranged in a linear sequence

b A central compartment connected to one or more peripheral compartments

c Only one compartment for drug distribution

d Compartments that do not communicate with each other

17 Which parameter is not required in multiple dosing calculations for plasma drug concentrations at any time 1

a Apparent volume of distribution
b Dosing interval
c Route of administration
d Size of dose

18 In a two compartment open model, the central compartment primarily represents 1

a Fat tissues
b Poorly perfused organs
c Highly perfused organs
d Bone and adipose tissues

19 For drugs with non-linear kinetics, the rate of elimination is 1

a Not correlated to plasma concentration
b Directly proportional to plasma concentration
c Not directly proportional to plasma concentration
d Equal to plasma concentration

20 Michaelis- Menten Kinetics describes 1

a Linear Pharmacokinetics
b Non linear Pharmacokinetics
c Pseudo- first order Pharmacokinetics
d Second order Pharmacokinetics

Q.II Attempt any 2 2x10

1 After an intravenous bolus injection of 250 mg of a drug following one compartment kinetics. The plasma concentration time profile is represented by – 10

$$C = 160e^{-0.17t}$$

Calculate

a) Volume of distribution and clearance. 2
b) Elimination half-life and AUC. 2
c) Time required to eliminate 35% of dose 2
d) Plasma concentration after 2 hours. 2
e) Amount eliminated after 5 hours. 2

2a Write a note on the concept of loading dose and maintenance dose. 5

2b Write a note on two compartment open model 5

3 Explain Carrier mediated absorption mechanism. 10

Q.III	Attempt any 7	7x5
1	Explain the effect of surfactant and compression force on absorption of drugs.	5
2	Discuss displacement interaction with any one suitable example.	5
3	Enlist phase I reactions and describe any one briefly.	5
4	State following statement is true or false with justification	5
4a	IV route is used as standard for calculating absolute bioavailability.	
4b	Human serum albumin is a versatile plasma protein.	
5	Write assumptions of one compartment open model.	5
6	Describe any four methods for enhancing bioavailability of drugs.	5
7	Explain absorption and distribution related causes for nonlinearity in pharmacokinetics.	5
8	Enlist theories of drug dissolution, explain any one in detail.	5
9	Enlist various dissolution apparatus official in USP? Explain USP type II apparatus.	5